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ABSTRACT

It is widely recognized that the American educational system has some important shortcomings. These shortcomings are the result of an educational system that is inadequate for today's information based society. This group-based, lock-stepped, graded, and time-oriented system has effectively destroyed the inherent desire of children to learn. In addition, the system is unable to adapt to the accelerated use of educational technology in the learning process. What is needed is a structural reform, but this reform must be made gradually and over a long period of time to permit sufficient time for planning, development, and improvement. In one suggested "third-wave" educational system, the teacher's role would change from one of disseminating knowledge to that of a guide who motivates, advises and manages the child's learning. Parents would choose the guide for their child, based on information from, among other sources, independent "consumer reports." Students and their teacher-guides would be grouped together in "clusters," with instruction provided through free-standing learning laboratories. Student learning goals and activities would be established by contract each quarter to provide a balance between structure and flexibility. A district wide "Consumer Aid" agency would serve both as a place to match students with teacher-guides and a watchdog service to provide reports on teachers, clusters, and learning laboratories. (34 footnotes) (EW)

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The Search for Meaningful Reform: A Third-Wave Educational System

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Abstract

It is widely recognized that our educational system has some important shortcomings. This paper proposes that such "problems" as lack of teacher incentives, poor student motivation, lack of leadership, and lack of community support are in fact just effects of a more fundamental problem. Just as the one-room schoolhouse, which was so appropriate for an agricultural society, proved to be inadequate for an industrial society, so our present system is proving to be inadequate for an information society. It is the fundamental structure of our educational system that is at the heart of our current problems. For example, it is our group-based, lock-stepped, graded, and time-oriented system that has the dubious distinction of effectively destroying the inherent desire to learn in all but a small percent of our children. Furthermore, micro computers are accelerating the trend toward increased use of nonhuman resources in the education of our children, and the current structure of our educational system cannot adequately accomodate the effective use of these powerful educational tools. But what alternatives are there? Until recently there have not been any viable ones, but our pedagogical knowledge has now evolved to the point where there is a viable alternative to the present structure. This article describes a general approach and a specific strategy for effecting the sorely needed structural changes, and describes some initial progress on implementing that strategy. This initial progress is a preliminary "blueprint" outlining the structural characteristics that a "third-wave" educational system should have.

There is a growing lack of confidence in our present public school system. Time Magazine has said,

> Like some vast jury gradually and reluctantly arriving at a verdict, politicians, educators, and especially millions of parents have come to believe that the U.S. public schools are in parlous trouble.1

The Chronicle of Higher Education reports that educators and noneducators alike are calling for sweeping reforms of America's public schools.2

The recent National Commission on Excellence in Education was created because of "the widespread public perception that something is seriously remiss in our educational system."3 The Commission's report, entitled "A Nation at Risk: The Imperative for Educational Reform", cites Paul Copperman as drawing the conclusion that "for the first time in the history of our country, the educational skills of one generation will not surpass, will not equal, will not even approach, those of their parents."4 The Commission concluded that, "if an unfriendly foreign power had atempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war."5 As Paul Berman has recently noted, "The debate is no longer over whether American education is in trouble, but over what should be done."6

What Is the Cause of Our Problems?

Before we can identify what should be done, we must identify the causes of the current problems with American education. The Commission cites poor content (we are teaching the wrong things), insufficient learning time (we are not teaching it long enough), poor quality of teaching (we are not teaching it well enough), low standards and expectations (we are not demanding enough from the students), and lack of leadership (we are not getting the kinds of initiative and direction that are needed from our administrators). But are these really the causes? Or are they symptoms of a more fundamental cause? Two things may be helpful to answer this question: (1) analyzing what goes on in a typical school and (2) looking at ways of improving systems in general.

Imagine you are a high school teacher. You want very much to excite your students about learning. How are you going to go about it? You have been handed a list of over a hundred students in four classes. You have a textbook that you are required to use and a year-end exam for which you need to prepare the students, so that all but a few minutes of classtime per week must be carefully scheduled in advance. On the first day of classes, twenty-five or thirty students will troop into your classroom at the ring of a bell and will troop back out 40 minutes or so later at the ring of another bell, regardless of whether the great moment of insight you have spent the entire class working up to is still two minutes away. The students will come into your class with very different levels of knowledge about your subject; most will not be very interested in it; and practically all will be hoping to be entertained more than educated. You don't really know anything about any of those students as individuals, so you are forced to focus your attention on the content and how you will deliver it to the "average" student in the class, rather than focusing on the individuals you are teaching and how you can address the needs and interests that each of them has.

Is a longer school day really the solution to your problems? Or better teacher training? Or higher expectations? Will such reforms help to

sustain a love of teaching in the teacher or to instill a love of learning in the students? Milbrey McLaughlin and associates at Stanford University have noted:

> Many of the current reform efforts aimed at improving the quality of teachers fail to consider the configuration of conditions that leads even the most dedicated teachers to experience demoralization and a sense of personal failure. Indeed, some of the organizational and environmental features that contribute most prominently to this sense of failure are also basic aspects of the current system of education in the U.S.7

Similarly, Willis Hawley notes that "Motivating teachers without changing other conditions that affect teaching will not only limit the effect of incentives, but may cause frustration and alienation."8 During my years as a high school teacher, I came to understand what many teachers have complained of: that the structure of the educational system is the root cause of most of the problems that beset our educational system.

What do we mean when we refer to the "structure" of our educational system? The structure is the basic organization of the teaching process. The major structural aspects of our present system include (1) group learning: having knowledge delivered to children in groups of 20 to 40 at a time, such that all children receive the same content at the same time and rate; (2) constant rotation: rotating the children from one teacher to another every 45 minutes or so; (3) time-based grade levels: requiring all children to "serve" the same amount of time before they are allowed -- or forced, as the case may be -- to progress to new levels of learning, regardless of when (or even if) they have mastered all the necessary knowledge and skills, (4) isolation: having all learning occur within the confines of the school walls and not encouraging (nor usually even allowing) parents or other segments of the community to participate and cooperate in the teaching process; and (5) administrative organization: having a single large school in a district, with administrators who are not also teachers and teachers who are relegated to a less influential and professional "staff" role within the educational system.

Of course there are other causes of our problems besides the structure of our educational system. Bad teachers do exist, lack of parental concern for their children does exist, and so forth. But there is increasing recognition that the major cause of the current problems with our educational system is the basic structure of that system. Theodore Sizer states:

> Can students learn how to learn to "study," when they are rushed from class to class over a seven-period day, where they are being taught by six or seven different teachers, no one of whom sees them more than five hours per week (and usually in groups of over 20 students), and when there is rarely any unequivocally reserved time for private study (homework, study halls)? Of course not. ... Until we honestly confront the inadequacy of school structure, we will continue to cheat students, frustrate teachers, and waste money.9

In A Place Called School. John Goodlad concludes:

> ... far-reaching restructuring of our schools and indeed our system of education probably is required for us to come even close to the educational ideals we so regularly espouse for this nation and all its people.10

Anne Westcott Dodd states:

> Band-Aid solutions proliferate: a longer school day and year, more required subjects, more homework, higher pay for teachers. But more of the same is not necessarily improvement. ... America can develop a whole new structure for public education 11

Maurice Gibbons laments, "Ironically, when the old paradigm falls into disrepute, we do not make major changes; instead, we focus more intensely on those things we have always done ...."12 Selma Wassermann talks about an alternative system

> in which each learner sets his or her own pace in working toward mastery of course material; ... in which teachers play diagnostic and facilitative roles, rather than controlling and judging ones; in which the initiative of the learners is cultivated rather than thwarted 13

Harold Shane talks about "a growing need to redesign -- not merely to reform -- education in the U.S."14 Ernest Boyer,15 Seymour Sarason,16 and Richard Brandt17 all advocate some structural reforms, and the list goes on and on. As Paul Berman put it, "The conclusion is inescapable: American education, as it is now organized. has reached the limits of its effectiveness."18

Comparing Systems

Educational systems are like other kinds of systems in many ways. How are other kinds of systems improved? Our transportation system consisted primarily of the horse for a very long time. Like the one-room schoolhouse, the horse was very flexible for meeting the needs of the individual; you could go almost anywhere you wanted to. But there were problems with the horse. It wasn't very fast or very comfortable, especially in bad weather. Now, some people spent a lot of time trying to reform the prevailing structure by doing such things as breeding faster horses and building better roads and bridges to improve the horse's speed, or making more comfortable saddles and creating carriages for the horse to pull to improve comfort. But the gains to be made were small compared with the development of an alternative structure, the railroad.

The railroad was far faster, more comfortable, more reliable, and more efficient than the horse. It could transport many more people much greater distances far more cost-effectively. But, like our current educational system, it was much less flexible; you were greatly restricted as to where you could go and when.

As society has continued to change, our transportation needs have also changed. We must travel ever greater distances in less time, and people need to have much more flexibility as to when and where they will go. Many people have spent much time "fine-tuning" the railroad. But the "quantum leap" again came from an alternative structure, in this case one that entails the use of a variety of transportation media, primarily the airplane and the automobile.

As the one-room schoolhouse, a "first-wave" educational system, was appropriate for what Alvin Toffler calls a "first-wave" agrarian society,19 so our present, second-wave, educational system has a structure and philosophy that were appropriate for a "second-wave" industrial society. Although there are problems with the industrial production model of schooling,20 one cannot help but note some structural similarities to an assembly line, whereby students move from one specialist teacher to another at the ring of a bell to have a new component of education added to them. A "third-wave" system will provide a quantum leap for meeting the changing needs of our society, and like our current transportation system, it is

likely that it will make use of a variety of means of learning, including peer tutoring, discussion groups, projects, and group activities of various kinds, in addition to well designed individualized resources and learning environments.21

Each structural change that has occurred in our transportation system has become possible only by the advance of technology, and in fact technological advances have made the rise of alternative structures inevitable. But the change is never revolutionary; it is evolutionary. Horses are still used for transportation in some places. Many trains are still in use today. And there are still many one-room schoolhouses. Structural reform is one of gradual replacement in places where the societal needs for change are strongest.

The process of structural reform in education will be a slow one for another reason as well. The more advanced our technology, the more room there is for improvements through fine tuning a structure. Look at how far the airplane has come since the Wright brothers' early days. How long was it between Kitty Hawk and the first trans-oceanic flight? How much longer until the first jet planes?

Although the change may be slow and gradual, it will also be sure. We can already see technological developments of the "Information Age" that are making structural reform inevitable. Since the invention of the printing press, there has been a gradual but steady increase in the use of nonhuman resources in the classroom, including textbooks, workbooks, handouts, and audio-visual materials of various kinds. Now, it seems that micro computers, because of their interactive capabilities, are greatly accelerating this trend. We are already reaching the point where the current structure of our educational system can no longer adequately accomodate the effective use of such resources. As more and better resources become available to relieve teachers of some of their more routine, boring tasks, we are likely to find even greater internal pressure for schools to adopt an alternative structure.

As we enter deeper into a "third-wave," highly technological, rapidly changing, information-oriented society, the present structure of our educational system will become more and more inadequate, both from the society's point of view and from the school's point of view, not to mention the child's point of view. According to Naisbit, an information society requires a different kind of person, one who is more of an analyzer, evaluator, problem solver and creative thinker, one who has more initiative, more love of learning, and more responsibility for his or her learning and decision-making.22 A third-wave educational system will provide a quantum leap in producing this kind of person.

In her excellent analysis of school reform reports, Patricia Cross23 compares the kinds of structural reform needed in schools with the kinds of structural changes taking place in businesses as outlined by Peters and Waterman in their best-selling book, In Search of Excellence.24 She concludes that

> In the long run, would-be reformers may be doing more harm than good, if they transmit the message that state officials can legislate and regulate educational excellence without paying attention to the task of creating climates of excellence at the local level. ... I have concluded that our commitment to the lock-step, time-defined structures of education stands in the way of lasting progress. It is simply unrealistic to think that all students can learn from the same materials, to the same standards

of performance, in the same amounts of time, taught by the same methods.25

In sum, as we advance into the information age, our highly regimented, graded, lock-stepped, group-based, and time-oriented rather than achievement-oriented system is less and less able to meet the needs of the individual, the society, and the school itself. Changing the curriculum, lengthening the school day, and legislating higher standards are band-aid approaches to fixing a broken leg; and they are likely to do as much harm as good in the long run.

In reference to the problems cited by the Commission's report, it is the structure of our educational system that renders the selection of content relatively insensitive to teachers and parents -- the two groups that perhaps should, as a team, have the strongest voice (with information and advice provided to them by "curriculum experts" and other concerned people). It is the structure of our educational system that leads to the establishment of "minimum standards" and expectations that are usually tailored to the least capable students in a class. It is the structure of the system that results in a very small proportion of the time in school being spent on actively learning. It is also the structure of the educational system that works against quality teaching by making it harder to teach well and by diminishing the rewards and incentives for quality teaching. Similarly, the structure of our system does not reward the kinds of leadership that are needed, and in fact it often rewards (or at least promotes) good bureaucrats and public relations people instead of good educational leaders.

But if this is true, how do we know that an alternative is feasible now? First, it is certain that an alternative will never be feasible if we don't work to develop it. If current feasibility were a necessary condition, the Wright brothers would never have gotten off the ground. But we are well beyond Kitty Hawk in the development of a "third-wave" educational system. The alternatives to a group-based, lock-stepped, time-oriented, graded system require the availability of well-designed learning resources and environments that are at once highly effective and highly motivating. Information technologies make it possible to create far better learning resources and environments than has ever been possible before, and those technologies are reaching a level of power and affordability that make them cost-effectively competitive for many educational tasks.

But "hard" technology (equipment) is only half the story. We haven't known enough about how to design effective and appealing learning resources and environments to make alternative structures for education feasible. Finally, that situation is changing and has in fact already changed enough so that a third-wave educational system is feasible.26 The important question then becomes, "What would be a workable approach for determining the best structure and for implementing that structure?"

An Approach for Improving Public Education

Many problem solvers in business, industry, and education feel that initial efforts should entail thinking in the ideal,

forgetting temporarily about constraints, and later compromising as necessary to implement a workable plan. When working with professors to help them to improve their courses, Syracuse University's Center for Instructional Development has found that many solutions that are initially thought of as unworkable under current constraints, are in fact workable, and that much better results are achieved by initially thinking in the ideal. In the ultimate analysis, this usually proves to be the most practical of all approaches.

Another important concern with respect to an approach for improving public education is that anything beyond fine-tuning of any system requires system-wide planning and modification. Any system that has evolved over as many decades as has our public education system has certainly developed many interdependent parts; and a basic tennet of systems theory is that, if you try to significantly change one part, the system will almost always work to change it back again. In fact, except in cases where gradual but sustained changes in the environment have caused gradual changes in a system, important changes in systems have not been gradual, piecemeal developments; rather each has taken the form of a "quantum leap", followed by gradual fine-tuning.27 Therefore, if we want significant improvement in public education, gradual, piecemeal modifications of the structure of the present system will not achieve the desired result. We need to develop an alternative system with a comprehensively different structure -- a quantum leap. The alternative system would then slowly and gradually be adopted by school districts across the country -- perhaps often as a single alternative school within a district -- as it became evident that the new structure would be better for that community's needs.

The following is an outline of a strategy for facilitating this gradual transition to a third-wave educational system.

A Strategy for Significant Educational Improvement

The airplane represents a quantum leap over the railroad in long-distance transportation. And just as a better long-distance transportation system (the airplane) was planned, developed, and gradually implemented and improved over a significant period of time, so also a better educational system can be planned, developed, and gradually introduced and improved over a significant period of time. In fact, any attempt to achieve widespread adoption of any significant innovation within a short period of time (such as occurred with Dewey's progressivism) is virtually doomed to crash, if it ever gets off the ground. The necessary training and coordination simply cannot occur effectively in such a short period of time, and the ideas and techniques inevitably become perverted and ineffective. Hence, the following strategy is offered:

Phase 1. Develop a comprehensive blueprint for an "ideal" third-wave educational system, with considerable input from educational analysts, practitioners, reformers, parents, and students. To the extent that it is cost-effective, conduct research and field tests on parts of the system to improve (replace, modify, or supplement) them as much as possible before

implementation of the first prototype.

Phase 2. Secure funding from private and government sources to implement a prototype.

Phase 3. Identify the community for implementing the first prototype, perhaps a new community that will be starting up a public school system, or perhaps a large city district in which the new system would function as an "alternative school" within the current system.

Phase 4. Select or develop necessary instructional resources (described later), train personnel, build or remodel facilities in the selected community, etc.

Phase 5. Open the prototype school and constantly monitor and revise the various aspects of the system until it operates effectively and smoothly.

Phase 6. Build an Institute to publicize results of the system, facilitate its adoption by interested school districts, train personnel (and train schools of education to train personnel), accredit schools (but this accreditation would supplement rather than replace state accreditation), monitor and disaccredit schools, develop additional educational resources, and so forth.

Adoption would be a local-school-district decision, and there would be severe limits on the number of new systems that could be implemented each year, because of the training and "retooling" requirements that could realistically be handled by the Institute. Within 10 years of the implementation of the prototype school, it is likely that fewer than five per cent of the nation's public school districts would have changed to the new structure. The limitation is not so much one of expense, for we do not anticipate that teacher training would be any more expensive than it is at present, nor would the buildings and resources be any more expensive. Rather the limitation is one of expertise. It will take time for schools of education to learn how to train the new type of teachers. Hence, the new system will be equally affordable for rich and poor districts alike. In fact, it seems plausible that the districts which are having the most trouble will be the first to want to adopt the new structure (especially if outside funds accompany it for the first year or two), thereby providing a significant means for redressing current inequality of educational opportunity.

We propose that this is a workable and not particularly expensive strategy for implementing a significant improvement in public education.

INITIAL PROGRESS ON A BLUEPRINT

The remainder of this paper reports on some preliminary efforts to develop a blueprint for the third-wave educational system (Phase 1 above). We organized a small team of theorists and practitioners, parents and teachers, to work for four months on the initial development of the blueprint. We decided to focus our attention on the structural aspects of an educational system, both because there is so much evidence that the current problems lie primarily in the structure of the system and because we feel

that the people of a community should decide on the goals and content of their children's education.

Foundations

Many people look back to the one-room schoolhouse with a good deal of longing and nostalgia. As with most things from the "good olde days," the one-room schoolhouse was not everything that we, our parents, or our grandparents remember it as being. There were, however, several educational advantages that the one-room schoolhouse had over our present schools. The teacher worked individually with most students, in contrast to our present group-based system. Students progressed at their own pace, as opposed to our current lock-stepped or tracked system. Students were not promoted to learn new skills and knowledge until they had mastered the current ones (nor were they held back once they had already mastered the current ones), in contrast to our present time-oriented, graded system. The teacher was responsible for the child (as opposed to a content area), was concerned with the whole child (as opposed to just one aspect of his or her intellectual development), and was often a partner with the child's parents and thereby responsive to their desires and able to draw on their influence.

Also, there were considerable benefits from having children of a variety of different ages in the same room, such as opportunities for peer tutoring and role modelling. A teacher was able to work with each child over a period of years and, therefore, a thorough knowledge of each child and a consistency in monitoring and follow-through existed that is often lacking in today's schools. In the present, second-wave school system, where children usually rotate from one teacher to another each day and completely change teachers each year, the teachers often just begin to know and understand most of the children by the end of the school year. This results in many needs going unmet and in a great deal of inefficiency in meeting those that are eventually met. And perhaps most important, the reduced knowledge and understanding of each child usually results in a great deal less caring than existed in the one-room schoolhouse. The negative effects of this problem have been made even more severe by today's large and impersonal school environments, which have done much to foment alienation and violence in our youth.28

We do not in any way believe that a third-wave educational system should merely be a one-room schoolhouse with modern paint. Times and needs have changed too much for that. But we do believe that we should carefully consider the positive and negative structural characteristics of our present and past systems in attempting to develop a structure that will be "ideal" for a third-wave educational system.

Overview

In our third-wave educational system, the teacher's role has changed from one of disseminating knowledge to one of motivating, advising, and managing the child's learning. Well designed resources (including interactive computer and videodisc systems), peer tutors, projects, and learning labs are used to convey most

skills and knowledge. A teacher is responsible for a child for a period of three to five years. And the school district contains a variety of small, competing "schools" for parents to choose from (all at no cost to parents, and with no power for any school to turn any child away, thereby providing a degree of diversity and simultaneously a degree of accountability that are both sorely lacking in the present system). These and other aspects of the structure of an "ideal" educational system are described next. However, it is important to keep in mind that this blueprint is not likely to be a solution to all our nation's educational problems. We hope it will help to encourage new ideas and to further developments in the design of a better school system.

Teachers as Guides

Most people who have advocated structural reform of our schools have called for a different role for teachers, a role that is more professional and that relies more on technology to free the teacher from routine tasks and drudgery. Accordingly, in the third-wave educational system, the relationship between the teacher and the child is not one of purveyor and receiver of information. First of all, not all learning occurs in schools; the parents and the community are important sources of learning. Therefore, one of the teacher's roles is to orchestrate and coordinate efforts by parents, community, and school. Second of all, within the school, most knowledge is conveyed through well designed resources (including objects, printed materials, and interactive computer-based instruction), inexpensive assistants (including apprentice teachers, senior citizen volunteers, parents, and peer tutors), projects, discussion groups, learning labs, resource people, and so forth.

Hence, the teacher is more a guide than a teacher, as is the case in the Montessori system, which has functioned extremely well in this mode. The role of the guide is one of motivating, advising, and managing the child, rather than delivering most of the content knowledge. The guide is a conductor rather than a musician. She or he is an instructional manager who helps the child and parents decide upon appropriate instructional goals (within limits) and then helps identify and coordinate the best means for the child to achieve those goals. And those goals go beyond the intellectual development of the child; they may extend to the child's physical, social, moral and psychological development, depending on the parents' wishes.

Guides work individually and in small groups with children to insure that they reach their goals. Therefore, there is no such thing as a "class" in the sense of a group of children who learn the same material in the same place at the same time for a whole term or academic year. (There are, however, occasional discussion groups and seminars, which are especially useful in such areas as literature; and some mini-courses utilize class meetings when better alternatives are not available.) Each child has individual educational goals and could be matched to a unique combination of resources with the help of a computer-based advisement and management system. The cost-effectiveness of this system is very promising and is discussed later.

Developmental Levels as "Grade Levels"

In the third-wave school system a guide is responsible for each of his or her students for one of the developmental stages of the child's life: a period of approximately 3 to 5 years. On the basis of work by Piaget, Erikson, and others, we currently conceive of four stages as being relevant to the school system: approximately ages 3 to 5, 6 to 9, 10 to 13, and 14 to 18. The school organization is structured around these four levels, enabling each guide to work with a child for an average of four years. Either the parents or the guide can request a change before the child has entered the next developmental level, but there is a "test period" of, say, 6 months during which no changes are allowed. The process whereby parents request a guide is described next.

Parents Choose Guides

Parents request a guide for each of their children. On the basis of information made available by an independent "consumer reports" type of district office and on the basis of word of mouth and interviews with guides, the parents request in order of preference about three to five guides (depending on the size of the school district). The "consumer aid" office also provides diagnostic testing and interviews to help parents make the best decision, or to make it for them if they are not interested. Each guide decides how many children to accept each year, but does not decide which children to accept -- that is decided by a formula that maximizes the number of first choices filled district-wide.

"Clusters" as Independent Schools

In other professions like medicine and law, professionals often work together rather than independently; and, unlike teachers, they maintain a high degree of decision-making participation in, and control over, the organization. In a similar way, even though parents choose an individual guide, that guide does not work independently, but is a member of a "cluster" of guides. A cluster usually consists of about 3 to 6 guides, their assistants, their students, and a leader, who is a "master guide".

Like a lawyer in a law firm, each guide has considerable responsibility for the success of the cluster, and considerable incentive to meet that responsibility (see next paragraph), and considerable power to meet that responsibility. In the present system, teachers are given the first but not the last two! Is it any wonder that the structure works against good results! Just as the "administrator" of a law firm is a practicing lawyer, so the master guide is an active teacher. But the master guide also has a variety of other responsibilities, foremost of which is instructional leadership for the cluster. Ultimately, the master guide has the major responsibility for the success of the cluster.

Incentives and Rewards

The cluster's success depends on how satisfied the parents

and children are, because its income depends in part on the number of first, second, and third choice requests for all of its guides. But it is the income of each cluster that depends on demand for its guides, not the income of each guide directly. A guide's salary is based only on the number of students he or she has and the cluster's gross income. Hence, there is considerable incentive to help any guides in the cluster who are not doing well. This results in a nice combination of competition between clusters (providing incentive for excellence and responsiveness to the community's diverse desires and needs) and cooperation within each cluster (providing support and encouragement among guides), not unlike that characterizing most other professions.

With respect to competition. the dependence of cluster income on parental satisfaction makes guides very accountable for what they do or don't do. If a cluster is doing a bad job of meeting parents' expectations, its income will fall, as will the income for all of its guides. With respect to cooperation within each cluster, the fact that a guide's income depends not only on his or her own efforts, but also on the success of the other guides in the cluster results in a much greater incentive to cooperate and help each other to insure that all the cluster's children do as well as they can.

Learning Labs

In the fields of law, accounting, and medicine, the general practitioner has access to specialists in different areas. In a similar way, the guide has access to various learning labs. A learning lab provides instruction in a specific subject area. It can be a traditional, discipline-oriented area such as biology or a cross-disciplinary, problem-oriented area such as pollution. These learning labs operate completely independently of the clusters.

All children in the school district receive a certain number of tickets or passes that entitle them to use the learning labs. The labs in turn receive their budgets on the basis of the number of passes that they collect, so there is considerable incentive to attract students and satisfy cluster guides' needs. Again there is a nice combination of competition between labs and cooperation within a lab. We currently envision three types of learning labs: "shopping mall" labs, site labs, and mobile labs. They are described in some detail later.

In summary, the major aspects we currently envision for the third-wave educational system are the following:

1. Teachers are guides who, in cooperation with the child's parents, motivate, advise, and manage a child's education for 3 to 5 years.
2. Resources (including well-designed materials, peer tutors, projects, discussion groups, learning labs, and resource people) are used to effect most of the learning.
3. There are no traditional "classes", but each child has individual goals, and a unique combination of resources and approaches is prescribed to reach those goals.
4. Guides work cooperatively within an educational cluster with

about 2 to 5 other guides, including a master guide.

5. The master guide sets the school climate and philosophy, hires guides and assistants, provides professional development for guides and assistants, and provides direction and leadership for the whole cluster.
6. After a trial period, parents are free to request to move their child to another available guide and cluster if they are not satisfied with their child's progress. Hence, individual guides and clusters are very accountable for what they do or don't do, and they have considerable incentive to work with parents.
7. Guides have a great financial incentive to cooperate and work together for the success of the whole cluster.
8. Guides can send children to learning labs of various kinds to receive the best available instruction on selected subjects.

The following is a more detailed description of the various aspects of the structure of this third-wave educational system.

Cluster Operations

Since the guide is the hub of this educational universe, we shall further describe the structure of the system on that level. As was mentioned above, every guide must belong to a cluster, which is much like a small law firm or medical clinic. Also, a guide is responsible for children for one complete level of development (approximately four years). In an exceptional case, a guide might prefer that his or her students be spread out over two or even three levels rather than just one. In such cases it is probably advisable that children switch to a different guide upon transitioning to the next level.

Each guide often uses apprentices (training to become guides), advanced students, and volunteers (including parents, senior citizens, and other members of the community) as assistants to help teach his or her students. Many receive credits for their services rather than money. Those credits entitle them to personal use of the learning labs for continuing education or the child care center for care of their own children. Tutoring is also a valuable experience for students. There is an apt addage that goes, "The best way to learn something is to teach it," and indeed I feel that I learned more about Economics in one year of teaching it in high school than in three years of majoring in it in college. Students are a very much overlooked resource that can save a school system much money, improve learning, and result in even greater benefits for the tutors. But they must have proper training and guidance to be most effective.29

At this point, our best guess is that in Level 1 (ages 3 to 5) each guide is responsible for about 25 children, in Level 2 (ages 6 to 9) about 35 children, in Level 3 (ages 10 to 13) about 45 children, and in Level 4 (ages 14 to 18) about 55 children. These differentials reflect the increased use of learning labs as the age level increases. Also, keep in mind that the services of apprentices, advanced students and volunteers considerably lightens the load of each guide. However, we must caution that these figures are our best guess at present, and experience may reveal better figures.

Also, as mentioned earlier, each guide decides how many children to accept; that is, what portion of a "full load" to accept. The importance of parent satisfaction keeps this figure from becoming too large, and the guide's personal income needs keep it from being too small. But if a guide wants to work half time on, say, writing a book or computer program, then he or she can do so by accepting fewer students (and receiving a lower income).

Anywhere from about 3 to 6 guides can comprise a cluster. With 4 guides in each cluster, there would be one guide on each of the four developmental levels, assuming that the cluster elects to serve all four levels. Such a cluster would have about 160 children spread out over the ages of 3 to 18. This means that there would be an average of about 10 children of any given age within the cluster. If the cluster serves only two developmental levels, there would be an average of about 20 children of any given age within the cluster. This size allows the children to get to know most other students in the cluster fairly well, resulting in a more friendly and caring environment and more cross-age interaction.

Specifics by Level

In Level 1 the guides are very similar to Montessori teachers.30 They introduce children to well-designed educational resources as the children become ready for them, and the resources do most of the teaching of knowledge and skills. The guides also arrange activities that help develop the child socially, emotionally, and physically (motor coordination). Children are exposed to a variable environment in which caring guides and assistants nurture their development and encourage them to alternate regularly between learning activity and social interaction, free play, exercise, and/or rest.

Most learning at this level takes place within appropriate cluster facilities, but field trips are occasionally taken so that the outside environment can influence the children's development. Mobile labs (discussed in the next section) and other outsiders (including parents) occasionally come and put on a program to enrich home-room activities.

Parents can leave their child in the cluster facility as long as they wish, but there is a charge if the child is left for more than six hours per day. This charge can be paid in money or in time contributed to the cluster. The more advanced children occasionally participate in activities in a Level II group. This facilitates their transition into the next level with a minimum of anxiety (even if the child advances to a different cluster). The timing of the full "graduation" to the next level is made in consultation with the parents and is based on a combination of the child's intellectual, social, and emotional development, including level of learning skills and degree of self-directedness and responsibility.

In Level 4. the opposite end of the developmental spectrum, the cluster facility is more of a conference room than a home room and activity room. Almost all content learning occurs in the learning labs, including lab-sponsored seminars, projects,

tutoring sessions, and so forth. Also, intellectual scavenger hunts entailing interdisciplinary problem solving are widely used. Guides spend much time monitoring and motivating the children and just plain caring. Much time is also spent in individual conversations, for the guide is more a counsellor (an educator in the true sense of the word) than a teacher. In the domain of cognitive development, those conversations are often directed at higher levels of knowledge, including synthesis and evaluation in Bloom's taxonomy31 and cognitive strategies (or generic skills) in Gagne's taxonomy.32 Service projects are often required of students.

The guide also works closely with the parents on such other concerns as the child's emotional, social, artistic, moral, and psychological development. This entails (1) identifying with the parents any aspects of development that need work or any obstacles to further development that need to be removed, and (2) developing an appropriate plan that entails certain parental actions as well as certain guide actions of which the parents approve. As parents who have occasionally felt as if we were at our rope's end with one of our children, we feel it should also entail providing advice -- when desired by the parents -- on how to handle behavior problems and how in general to increase the quality of home life.

On the intervening levels (II and III), the guides serve both roles described above (for Levels I and IV). The degree to which each role is played by the guide progresses as the child develops from a Level I person to a Level IV person.

At whatever level, each guide must abide by a "renaissance approach" that establishes certain minimum levels of development in each of a broad range of basic areas (including basic skills). I have wonderful memories of a summer camp in which we campers were allowed to go to whatever activity we wanted whenever we wanted. There was a big chart on which achievements in each activity were posted for each camper, and we had to progress by at least one level of achievement in each activity every week. That way, when we went to do an activity that we didn't particularly like, we decided when to do it and we were motivated to get it done. And of course we all tended to far exceed the one-level minimum in activities that we liked. Also there were points given for each achievement, and campers were members of teams that competed to get the highest number of team points.

Similarly, in our "ideal" educational system, as long as the minimum levels of achievement are met in all areas, the children can study whatever they want whenever they want. As might be expected, the yearly and quarterly minimum levels <u>vary</u> depending on the general ability level of the child. For example, a child with an IQ of 50 is not expected to achieve the same minimum levels as one with an IQ of 150. Benjamin Bloom has evidence to suggest that the differences in rate of learning that currently exist in our schools are more a function of differences in accumulated skill and knowledge deficiencies than of differences in "intelligence" per se.33 The emphasis is on each child achieving according to his or her potential. For "late bloomers" the minimum levels are adjusted to represent relatively larger steps.

The guide maintains an achievement profile on each of his or her students on a computer-based advisement and management system. Grades are not given, because in an information society, a profile of the kinds of abilities and knowledge one has is more important than a letter grade or a general rank in class.

There are cluster-wide and district-wide interest groups and clubs, dealing with such interests as computers, drama, photography, woodworking, music, chess, dance, etc. There are also cluster-wide and district-wide social events and athletic events. A major benefit of this structure is a much higher rate of student participation in athletics and other interests. Opportunities for leadership and exercise of responsibility are also increased.34 Volunteers (parents, senior citizens, and other community members) and older students do much of the supervision, much as is presently done with Little League baseball and Scout programs.

Learning Labs

It was mentioned earlier that learning labs provide specialized expertise on different subject areas; and we have recently seen that the older the child, the more the labs are used. A learning lab can be for a traditional, discipline-oriented area such as biology or for a cross-disciplinary, problem-oriented area such as pollution; and it can be for an intellectual area such as philosophy or for a technical area such as automobile maintenance and repair. In all cases, labs would be encouraged to incorporate instruction in thinking skills and other higher-order skills into the content area instruction, and guides would be responsible for helping the student to put together a program of study that represents a good progression of such higher-order skills instruction. Resources are allocated to the labs on the basis of their usage, providing a combination of cooperation and competition similar to that for the clusters.

We mentioned earlier that there are three types of learning labs: mobile labs, "shopping mall" labs, and site labs. The mobile labs are labs on wheels that travel around from one cluster to another and even from one district to another. The shopping mall labs are centrally located labs to which the children in a district go. They range from a one-room, one-person (part-time) "craft shop" operation to a nation-wide operation (the Sears of the shopping mall labs). There tends to be continuous (although not too frequent) turnover as the "offerings" adjust to changing times and changing demands. Also, there are cooperative arrangements whereby children may use labs located in another school district. The site labs are located at the part-time organizations which sponsor them, such as museums and businesses. Tax write-offs are an important incentive for the creation of such labs.

All learning labs must be approved and periodically recertified by the school district's Lab Management Organization (described later). Learning labs can be started by almost anyone in any subject area, including cross-disciplinary areas, but certain training and standards (especially regarding character)

are required. A learning lab director runs the lab; and depending on the nature of the lab, the director finds out about and makes available top-quality resources, plans good activities, makes arrangements for community-based experiences, hires, trains and monitors assistants (apprentices, advanced students, parents, and other members of the community) to help teach, and/or interacts personally with children to motivate, advise, and manage their learning within that specialty area. Teachers refer their students to specific learning labs and even to specific personnel in a learning lab. Many learning labs are run by part-time amateur/hobbyists and retired people at very little expense to the school district.

Logistically, the shopping mall labs would likely be located at the "hub of a wheel" in which the clusters are located in separate buildings out on the "rim," attached by enclosed walkways ("spokes"). This arrangement would eliminate the need for transportation and would allow for district facilities such as library, auditorium, child-care facilities, and food services to be easily accessible to all clusters, while still maintaining some physical separateness for each cluster. (Although food preparation could be done centrally, each cluster should have its own cafeteria to help build cluster cohesion.) Very large districts might have several such "wheels" at different locations within the district. Although such a logistical arrangement might be ideal, existing school buildings could be utilized with relatively few modifications to meet the same needs.

How the Student Uses the Learning Labs

At the beginning of each quarter (three month period), each student in the district is awarded a certain number of learning lab passes. The exact number depends on the child's level of intellectual development -- the higher the development, the more passes awarded. Also, each child can earn additional passes through such activities as tutoring, helping with the preparation of displays and materials, supervising extra-curricular activities, etc.

Some of the passes are "restricted" passes and some are "open" passes. The restricted passes must be used for the study of skills and knowledge specified by the child's "quarterly contract" (see below), whereas the open passes can be used to study anything. This results in a combination of structure and flexibility similar to that of the summer camp described earlier.

Each pass must be filled out and signed by the guide, who indicates the lab in which it is to be used. This helps the guide to influence and keep track of the child's learning. The child hands in the pass to the lab, so that the lab can then cash it in for payment from the district office. The passes could be implemented electronically with magnetic ID cards and electronic time clocks that feed data on student and lab usage into the district-wide, computer-based, advisement and management system. Teacher approval would be entered into the computer system, and the system would reject any child who tried to log in to a lab without such approval. Each lab allows each student a minimum of one hour of free "browsing" every quarter for purposes of seeing

if there is anything he or she would like to learn in that lab. Of course, the lab receives remuneration from the school district for such browsing.

Having a limited supply of passes to use in a quarter, the children are more concerned with making the most of each one -- that is, not wasting precious time "hacking around." And having the flexibility to study what they want when they want (within the structure of the minimum requirements and the other goals specified in each child's quarterly contract) provides heightened motivation and increased self-determination and self-management that are so important in an information society.

What the Student Does

At the beginning of each quarter, the guide sits down with each of his or her students and the student's parents, if possible. Together, they prepare a plan or contract for the child's learning goals and activities for the quarter. As a result of this plan, a checklist of required goals and activities is prepared (probably with the help of the computer-based advisement and management system), and the use of restricted passes is planned. However, the plan is devised in such a way as to leave some time for children to pursue their own interests with their open passes, whose use is also discussed and informally planned at the beginning of each quarter.

The intent here is to establish a balance between structure and flexibility. Each cluster may establish its own policy (or lack thereof) with respect to the balance between requirements and options, except that the district may establish certain minimum levels of development in different areas for different age groups (perhaps adjusted by individual limits to rate of development as measured by, say, IQ or some better indicator).

At this time, the guide and parents may also have a private conversation about any problems the parents are having with the child so that the guide can give advice and/or take steps to help out. The guide also identifies things the parents can do or need to do to help the child achieve his or her quarterly goals (not just intellectual, but also emotional, social, artistic, physical, etc.).

At the end of each quarter, the guide sits down with each child and the parents (although two separate meetings would not be uncommon) and reviews the child's achievements in relation to the contract for the quarter. This provides part of the basis for planning the next quarterly contract, which usually occurs at the same session.

Extensions of the Present System

The present educational system would be extended in two important ways, in addition to the concern for non-academic aspects of the child's development: (1) it is open longer and (2) it is open for use by adults. It is open longer in three ways. It is open more hours per day, until, say, 9:00 p.m. This is done at very little extra expense because it is largely supervised by volunteer help. It is open on weekends, again at little extra expense due to volunteer help. And it is open all summer long.

Students can take vacations whenever their parents want, due to the individualized structure of the school. Similarly, guides and staff can take their vacations pretty much whenever they want because of the multiple-leveled staffing structure of the system (apprentice guides, volunteers, and older students). Guides feel less of a need for a long vacation in their new roles, and this eliminates the need for teachers to find summer employment at what are often not very rewarding (professionally or financially) jobs. Hence, it makes education a year-round profession, like law and medicine, with flexible opportunities for vactations.

Adults (people over 18 years old) can buy or earn passes to use the learning labs, making the school system a place where young and old can learn together. It also provides an extra source of income and labor for running the school system.

District Organization and Administrative Systems

All school tax revenues, block grants, and state aid go directly to the school district office for district-wide distribution. The district office establishes a budget for clusters (probably by establishing an amount per pupil and multiplying by the number of pupils anticipated for that year) and a budget for the Learning Lab Management Organization (probably by establishing an amount per pass and multiplying by the number of passes anticipated for that year). The budget for clusters is allocated to each cluster in accordance with the demand for its guides. The budget for the Learning Lab Management Organization is allocated to each lab in accordance with the number of passes it receives, except that a certain per cent is kept to meet its administrative expenses. Finally, the Consumer Aid Agency receives a flat per centage of the total school district budget (around one-half of one percent), and the district office keeps a flat per centage for its administrative expenses.

Cluster Organization and Administration

A new cluster can be started by anyone who meets the requirements, but a cluster can be disbanded if it ever fails to meet minimum standards set by the school board (and individual personnel can be "disbarred" if they are found by the district review board to be negligently unprofessional). It is probably wise to specify a minimum of two or three guides for forming a cluster. Training and certification are required for anyone who wants to be a guide. This training and certification would be provided by schools of education that have been certified by the Institute. Some local training may also be required regarding the district's computer-based advisement and management system and current learning labs. The master guide is chosen by the guides that comprise the cluster, and a 2/3 majority is required to replace the master guide.

For an established cluster, the hiring of new guides is decided by a 2/3 majority of the cluster's guides. The firing of a guide would be based on standards that are clearly laid out in the charter of the cluster or school district regulations, but those standards should allow a sufficient length of time for new

guides to improve and for older guides to reform their ways. Because of the importance of cluster cohesiveness and cooperation among guides, a simple majority is sufficient for a cluster's guides to decide whether or not the criteria for release have been met. There is no grievance or appeal procedure, again because of the importance of cluster cohesiveness and cooperation among guides. There is no grievance procedure when a lawyer or doctor is kicked out of a law firm or medical clinic, but such is extremely rare.

An administrative person from the district office is in charge of the accounting, reporting, and logistical aspects for all clusters within the school district, but the cluster decides how its budget will be spent. This frees the head guide to concentrate on instructional concerns and school climate.

It was mentioned earlier that each cluster's gross income is dependent on the total demand for its guides. A point system is used whereby each guide receives 3 points for being the first choice of a "new" student, 2 points for being the second choice, and 1 point for being the third choice. A "new student" is one entering a new level of development, one entering the school system for the first time, or one requesting a new guide after the six-month trial period. The "income rate" for each cluster is determined solely by the cluster's total points divided by the number of guides in the cluster. The cluster's budget is then determined by adjusting that income rate according to the average per cent of "full capacity" for its guides (determined by the actual number of students divided by the full-load number of students for each developmental level). In turn, the guides' salaries are based only on cluster budget and individual load -- no merit -- and are a per cent of the cluster's gross income. Hence, the only way to increase one's salary, as in a law firm or medical clinic, is to increase the demand for the cluster's guides. In this way, there is a tremendous incentive to cooperate within each cluster. All master guides receive a fixed salary supplement set by the school board.

It might be beneficial to have two levels of guides based on merit, such that a beginning guide would likely not receive the same salary rate as a veteran guide. However, this raises difficult questions as to who should make the promotion decision. Alternatively, it might be beneficial to allow each cluster to set its own salaries, for the guides will know that if their other budget categories suffer, parents will be displeased and the cluster's points -- and budget -- for the next year will be lower.

Some districts may also want to allocate a certain fixed dollar amount per student to each cluster's budget, to partially even out the expenditures per student across clusters. However, it should be understood that the more the cluster (and lab) budgets are influenced by demand for them, the easier it will be for superior ones to grow and thereby offer a better education to more students in the district. It will also be less necessary for the district office to close down weak clusters (or labs) by executive mandate, which is likely to be politically difficult, if not impossible. This will be less necessary because insufficient personal incomes will lead the guides in less successful clusters

to seek more lucrative positions on their own initiative. In the long run the community will be better off by rewarding excellence and not encouraging mediocrity to linger on.

Learning Lab Management Organization

There is a Learning Lab Management Organization which has the following responsibilities:

- It surveys the needs of the clusters for external instructional support (from labs) and prioritizes those needs.
- It contracts new learning labs. These may be (1) part-time individuals (e.g., a retired biologist who lives in the community and is willing to devote a part of her time to the school district), (2) part-time organizations (e.g., a local museum or business which is willing to devote a part of its time to the school district), (3) full-time individuals (e.g., a mechanic who would like to quit his job and work full-time with kids), and (4) full-time organizations (e.g., a publishing company that has established a subsidiary for running learning labs in schools across the country).
- It trains lab directors whenever necessary, and it provides professional development support services to the labs upon request.
- It distributes money to the labs according to the amount that each lab is used.

An administrative person in the district office is responsible for the accounting, reporting, and logistical aspects for all labs within the school district, but again each lab decides how its budget will be spent.

Consumer Aid Agency

The district-wide Consumer Aid Agency which was mentioned earlier serves (1) as a placement counseling service for matching children with guides and (2) as a watchdog service for providing "consumer reports" on clusters, guides, and learning labs (explained below). This Consumer Aid Agency is run by parents (many on a volunteer basis) but receives a permanent fixed budget (something like one-half of one percent of the total district budget) as part of a system of "checks and balances".

The Consumer Aid Agency's counselling service helps parents to decide which guide will be best for their child. It maintains extensive data on each guide's characteristics and accomplishments, and it diagnoses a child's needs if parents so desire, so as to enable them to select the guides which seem most likely to meet those needs. Such people-categories as "intuiter" and "thinker" may be very useful for part of this function.

The Consumer Aid Agency's watchdog service has responsibility for collecting and disseminating information about the quality of performance of the clusters, guides, labs, and Lab Management Organization.

Given that some parents do not care enough to choose a guide for their child, the placement service diagnoses each such child's needs and applies for the most appropriate guides. However, such applications are not included in the point count described under "Cluster Organization and Administration" above, to avoid the

temptation for dirty politics. Federal, state, and local supplements for disadvantaged children would be passed through the district office directly to the clusters' budgets.

Cost-Effectiveness

No thorough cost analysis has been performed as yet, but preliminary indications are that this system would cost approximately the same per student as our present system, yet would be considerably more effective. Although guides are paid more than present teachers, their various assistants (apprentice guides, volunteers, and older students) cost considerably less. Their use enables a much higher student-guide ratio, but with increased human contact and caring.

The learning labs are the element which may most influence costs. The number of labs and relatedly the number of passes provided to students each quarter will greatly influence the cost. Also, the extent to which the labs are staffed and/or directed by volunteers or semi-volunteers (those who accept nominal payment to supplement retirement or other income) will also greatly influence the cost.

In a small school district, it might be wise for each guide to also serve as a lab director, with a fewer students to guide. We presently anticipate that this entire system can be run within present school budgets, especially given that local businesses, foundations, and individuals would be considerably more inclined to sponsor learning labs, including basic-skill and content-area shopping mall labs, as well as more application-oriented and problem-oriented site labs.

CONCLUSION

Much work needs to be done to further develop, field test, and refine this blueprint of a third-wave educational system to the point where we can begin to think about implementing it in a pilot school. And this only represents the first step in a systematic strategy to make significant improvements (a quantum leap) in our educational system. Although the road to meaningful, structural reform of public education is long and difficult, we feel that the strategy and approach are both very sound. With persistance and dedication from a national coalition of concerned citizens, we feel confident that we can achieve very significant improvements. We would be interested in hearing from anyone who would like to be a part of this effort.

Footnotes

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